

CHAPTER 5. RETAIL PRICES

TABLE OF CONTENTS

5.1	OVERVIEW	5-1
5.1.1	Background	5-1
5.1.2	Retail Price Definition	5-1
5.1.3	Retail Distribution Channels	5-1
5.1.4	Retail Price Sources	5-1
5.2	APPROACH	5-2
5.2.1	Purpose	5-2
5.2.2	Baseline Water Heaters	5-2
5.2.3	Water Heater Price Database Characteristics	5-3
5.2.4	Sales Tax	5-5
5.2.5	Regional Representation	5-6
5.3	RETAIL PRICE AND INSTALLATION COST SUMMARY	5-8
5.3.1	Retail Prices	5-8
5.3.2	Installation Costs	5-10
5.3.3	Water Heater Shipments	5-12
5.3.4	Other Summary Information	5-12

TABLES

Table 5.1	Water Heaters in Database and Shipments by Fuel Type	5-3
Table 5.2	Sales Taxes	5-5
Table 5.3	Regional Distribution of Data Sources and U.S. Population	5-6

FIGURES

Figure 5.1	Water Heater Units by Distributor Type	5-4
Figure 5.2	Store Locations Represented in Water Heater Price Database	5-7
Figure 5.3	Unit Count of Electric Water Heaters in Database	5-8
Figure 5.4	Unit Count of Gas-Fired Water Heaters in Database	5-8
Figure 5.5	Retail Price Ranges: Electric Water Heaters	5-9
Figure 5.6	Retail Price Ranges: Gas-Fired Water Heaters	5-9
Figure 5.7	Unit Count of Electric Water Heaters with Installation Costs	5-10
Figure 5.8	Unit Count of Gas-Fired Water Heaters with Installation Costs	5-10
Figure 5.9	Installation Cost Ranges: Electric Water Heaters	5-11
Figure 5.10	Installation Cost Ranges: Gas-Fired Water Heaters	5-11
Figure 5.11	Electric Water Heaters: Shipments vs Sample Data	5-12
Figure 5.12	Gas-Fired Water Heaters: Shipments vs Sample Data	5-12

CHAPTER 5. RETAIL PRICES

5.1 OVERVIEW

5.1.1 Background

The water heater retail price analysis looks at the residential water heater market and particularly at water heater purchase prices. The source of the retail price data is the Water Heater Price Database, developed specifically for this purpose.¹ The water heater energy-efficiency standards analysis uses price information from the database to estimate the impact that proposed standards could have on water heater retail prices. Changes in regulations can lead to increased costs that are passed from manufacturers to retailers and consumers in the form of higher retail prices.

5.1.2 Retail Price Definition

For purposes of this analysis, retail price is considered to be the cost of the water heating equipment only. It is the price paid to a plumbing wholesaler or retail outlet by a consumer or plumbing contractor. Sales tax is accounted for separately. The cost of installing a water heater is not considered to be part of the retail price.

5.1.3 Retail Distribution Channels

The two major distribution channels for water heaters are plumbing wholesalers (e.g., Ferguson, Noland, etc.) and large retailers such as Home Depot and Sears. Manufacturer's sales are approximately equally divided between wholesalers and retailers which has led to a near equalization of prices between the two channels. Most manufacturers sell to both wholesale and retail outlets; however, certain manufacturers, such as A.O. Smith and Bradford White, distribute only through wholesalers. In 1996, approximately 4.2 million water heaters were sold through plumbing wholesalers and 4.7 million were sold through retailers. Installers buy from either source, though water heaters sold for new housing construction are sold primarily through plumbing wholesalers.

5.1.4 Retail Price Sources

The Water Heater Price Database contains extensive data on retail prices for electric and natural gas water heaters; it contains limited information regarding retail prices for LPG water heaters and even more limited information on those for oil water heaters. While the data in the Water Heater Price Database are based on interviews with various types of water heater vendors in many regions of the U.S., e.g., large retailers, plumbing wholesalers, small suppliers, Web-sales, and utility representatives, the majority of price information was gathered from large retailers and plumbing wholesalers. The database contains retail prices for many water heaters currently on the market, but it lacks information on the actual number sold. In both the database and in the discussions that follow here, *models* refers to water heaters with a common set of design

characteristics made by one manufacturer that have a common model number. The term *unit* refers to an individual instance of that model type recorded in the database. There are 1,064 units recorded in the database, of which 1,031 are unique models. Detailed information about the database is provided in Appendix B. The oil-fired water heater retail prices were collected from interviews with approximately 25 oil equipment installers who buy water heaters from manufacturers and sell directly to consumers.² In the case of oil-fired water heaters, the retail price does not include the cost of the burner.

5.2 APPROACH

5.2.1 Purpose

We need the water heater retail price in order to determine the markup from the manufacturing cost to the price paid by consumers. This markup is important for the assessment of the impact on consumers of possible future design changes that aim to improve water heater energy efficiency. In addition, the price data collection and analysis of fees associated with installation, delivery, parts, permits, etc., for different size water heaters allow us to assess other consumer costs for installing water heaters.

5.2.2 Baseline Water Heaters

The markup between manufacturing cost and retail price was developed for baseline water heater models. The baseline model represents the most common size water heater for a given fuel type with an efficiency rating equal to the minimum allowed by existing energy-efficiency standards. The general characteristics of baseline models are described in detail in the Engineering Analysis (Chapter 8).

Manufacturer warranty is directly associated with the water heater retail price. For purposes of determining markup, water heaters warrantied for five or six years are considered to be baseline models. Five and six years are the minimum warranty periods recently offered by water heater manufacturers (although a one-year warranty is offered in special cases) and is typically reserved for models produced in large quantities, i.e., baseline models. The six-year warranty became the standard within the past two years, though five-year warranty models are still sold; therefore, this analysis includes both five- and six-year warranties in the definition of the baseline water heater. Note that a longer warranty period, in addition to a higher price, may indicate the presence of features not usually found in baseline models.

Baseline models differ according to fuel type and size. All baseline models we selected for gas-fired (both natural gas and LPG)^a and oil-fired water heaters have 1 in. of HCFC-141b foam insulation, and all baseline electric water heaters have up to 2 in. of HCFC-141b foam insulation. The most widely distributed sizes are 40-gallon rated volume gas-fired water heaters, 50-gallon rated volume electric water heaters, and 32-gallon rated volume oil-fired water heaters.³

5.2.3 Water Heater Price Database Characteristics

Four fuels are used to operate water heaters. Although all fuel types are represented in the database, the data focus on the two main fuel types: electricity and natural gas. LPG and oil units are not significantly represented. The baseline models comprise a major selection of the units in the Water Heater Price Database. For example, 44% of the electric water heaters in the database have a rated volume of 50 or 52-gallons and 45% of the natural gas water heaters have a rated volume of 38 to 40 gallons. The data collected for oil water heaters show that almost 90% of the residential installations are 32-gallon units.

The number of electric and natural gas water heater units in the database reflect the actual shipments of electric and natural gas water heaters in the U.S. Approximately 4.2 million electric, 4.7 million natural gas and LPG, and 40 thousand oil-fired water heaters are shipped each year.³

The number and percent of water heater units represented in the database compared to shipment data for the year 1998 are shown in Table 5.1.

Table 5.1 Water Heaters in the Database and Shipments by Fuel Type

Fuel Type	Water Heaters in Database		U.S. Water Heater Sales in 1998	
	Number of Units	Percentage %	Number of Units <i>Millions</i>	Percentage %
Electric	474	44.6	4.16	46.9
Natural Gas	524	49.2	4.31	48.6
LPG	63	5.9	0.36	4.1
Oil	3	0.3	0.04	0.4

^a Water heaters fueled by natural gas and LPG are considered as one product class from the point of view of physical and efficiency characteristics. They are treated separately with respect to manufacturing cost, markup, retail price, and fuel price in the Life-Cycle Cost and subsequent analyses.

Figure 5.1 displays water heater units by type of distributor according to data from the Water Heater Price Database. The collected data show that a great majority of water heaters are sold by retail outlets (e.g., Home Depot and Sears) and plumbing wholesalers (e.g., Ferguson and Noland). Small suppliers, which make up about 5% of water heater units, are businesses that supply retailers and wholesalers with water heaters and occasionally sell to consumers. Web stores, which make up about 2% of water heater units in the database, offer sales on-line. Web sales refer to stores that have a web sales division, such as W. W. Grainger, Inc., as well as to Web-only based stores.

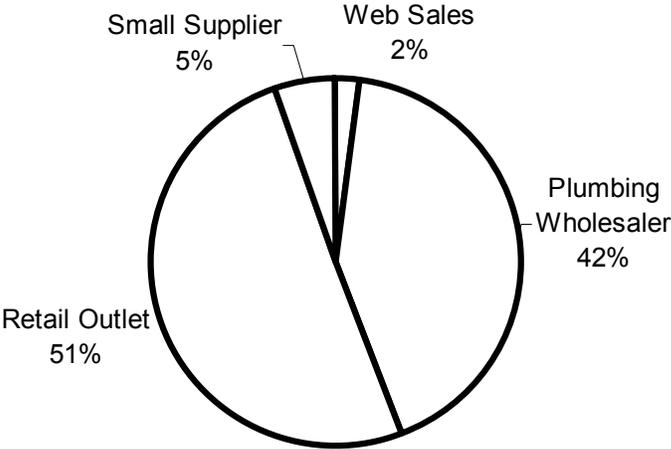


Figure 5.1 Water Heater Units by Distributor Type

5.2.4 Sales Tax

We collected sales tax information from the contacted sources at the same time we collected water heater unit price information. Table 5.2 shows the distribution of sales taxes for the stores listed in the Price Information Table of the Water Heater Price Database. Note that in some cases there are several listings for one state because of differences in regional taxes. The distribution of taxes is used in the Life-Cycle Cost Analysis (Chapter 9), while an average sales tax of 5% is used in the Engineering Analysis (Chapter 8).

Table 5.2 Sales Taxes

Store State	Sales Tax %						
AK	0.00	IA	6.00	NC	6.00	OR	0.00
AR	6.13	ID	5.00	NE	5.50	PA	6.00
AZ	4.30	IL	6.25	NJ	3.00	SD	0.00
AZ	6.80	IL	8.75	NJ	6.00	SD	6.00
CA	7.50	IN	5.00	NM	5.81	TN	8.25
CA	7.75	KS	6.88	NV	7.00	TX	7.87
CA	8.25	KY	6.00	NY	6.75	TX	8.25
CO	7.30	LA	9.00	NY	7.00	UT	6.25
FL	6.00	MA	5.00	NY	8.25	VA	4.50
FL	6.50	MI	6.00	NY	8.50	VA	4.75
FL	6.75	MN	7.00	OH	5.75	WA	7.80
GA	5.00	MO	6.72	OH	7.00	WA	8.00
GA	6.00	MS	7.00	OK	6.50	WA	8.60
GA	7.00	MT	0.00	OK	8.38	WI	5.50
						WV	6.00

5.2.5 Regional Representation

Data collection and retail price analysis were done at Lawrence Berkeley National Laboratory (LBNL) in Berkeley, CA, over a two-year period from 1997 to 1999. Data were also received from Pacific Northwest National Laboratory (PNNL), Arthur D. Little, Inc. (ADL), and from Oregon utility companies. Table 5.3 shows the regional distribution of data sources as well as the population breakdown by region.⁴ The regional comparison shows that the distribution of water heaters in the database reasonably resembles the regional distribution of the U.S. population.

Table 5.3 Regional Distribution of Data Sources and U.S. Population

Region	Population		Number of Water Heaters in Database			
	Millions	Percentage	Electric	Natural Gas	Total	Percentage
Alaska/Hawaii	1.8	0.7	8	12	20	2.0
Pacific	9.0	3.3	77	30	107	10.9
West South Central	10.3	3.8	20	16	36	3.7
New England	13.5	5.0	23	18	41	4.2
Florida	15.0	5.5	61	51	112	11.4
East South Central	16.6	6.1	17	16	33	3.4
Mountain	17.1	6.3	51	53	104	10.6
New York	18.2	6.7	10	20	30	3.0
West North Central	18.8	6.9	32	23	55	5.6
Texas	20.0	7.3	13	13	26	2.6
Middle Atlantic	20.1	7.4	5	64	69	7.0
South Atlantic	34.5	12.7	84	81	165	16.8
California	33.1	12.2	28	68	96	9.8
East North Central	44.4	16.3	40	49	89	9.0
National Retailer*			5	10	15	
Total	272.4	100.0	474	524	998	100.0

*Grainger Industrial and Commercial Supply 1998-99 Catalog No. 389.

Source: Population Reference Bureau, 2000.

Figure 5.2 displays the locations of sources that provided price information listed in the database.

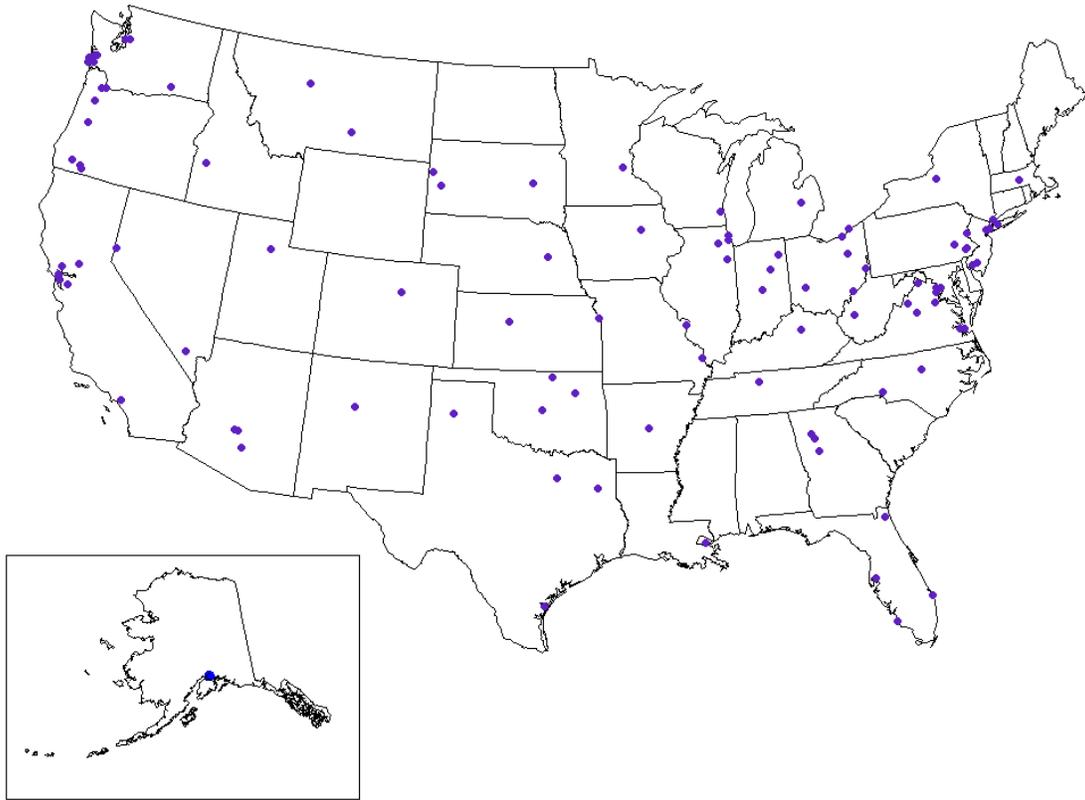


Figure 5.2 Store Locations Represented in Water Heater Price Database

5.3 RETAIL PRICE AND INSTALLATION COST SUMMARY

5.3.1 Retail Prices

The retail price analysis is based on information in the Water Heater Price Database. For example, the median retail price for a 50-gal electric water heater is based on 97 retail prices for baseline water heaters and the median retail price for a 40-gal natural gas water heater is based on 98 retail prices. Figure 5.3 presents the number of units in the database of each standard size electric water heater. Figure 5.4 presents the same data for natural gas water heaters.

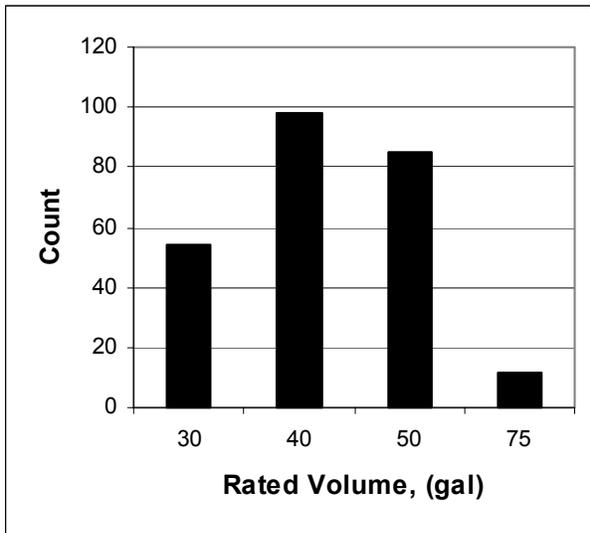


Figure 5.3 Unit Count of Electric Water Heaters in Database

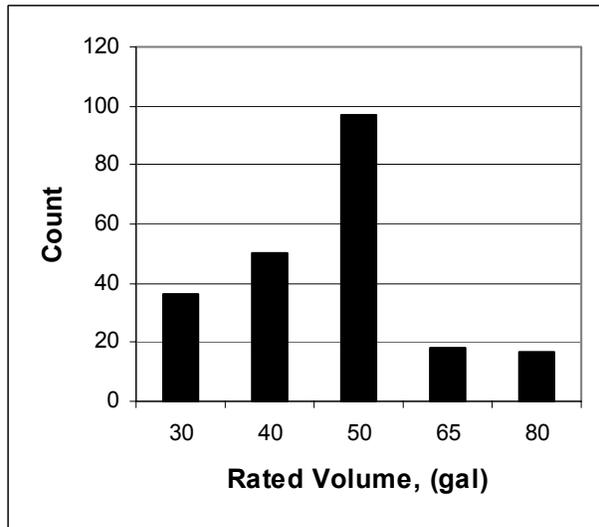


Figure 5.4 Unit Count of Natural Gas Water Heaters in Database

The retail prices for all standard-size baseline water heaters contained in the Water Heater Price Database are shown in Figure 5.5 for electric water heaters and in Figure 5.6 for natural gas water heaters. The mid-values represent the median reported retail prices. The figures also show the minimum and maximum values for the retail price ranges from the data collection. For example, the mean retail price for a 50-gal electric water heater is \$182.00, the minimum reported retail price is \$128.00, and the maximum is \$385.00. In the case of natural gas water heaters, the mean retail price for the 40-gal size water heater is \$167.00, with a minimum of \$115.00 and a maximum of \$276.00. The median retail price for oil-fired water heaters is \$445.60, with a minimum of \$285.00 and a maximum of \$700.00. These retail prices do not include sales tax.

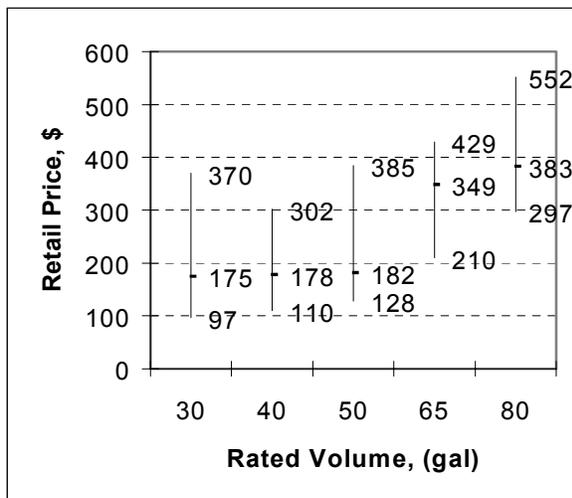


Figure 5.5 Retail Price Ranges: Electric Water Heaters

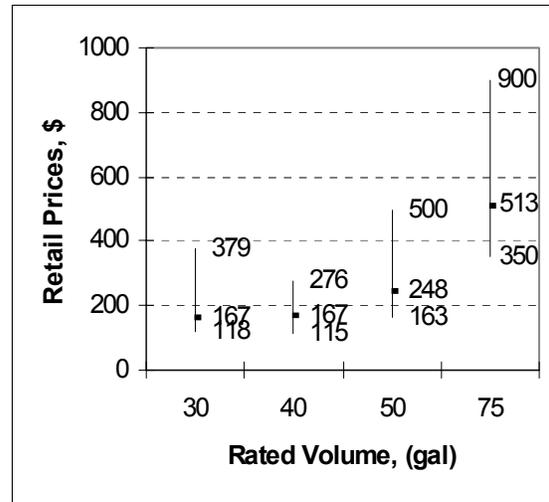


Figure 5.6 Retail Price Ranges: Gas-Fired Water Heaters

5.3.2 Installation Costs

The installation cost analysis is also based on information in the Water Heater Price Database. Figure 5.7 presents the number of retailer responses for electric water heaters upon which the installation cost data are based. Figure 5.8 presents the number of responses for gas-fired water heaters upon which the installation cost data are based. For example, the median installation cost for a 50-gal electric water heater is based on 57 responses about installation costs for baseline water heaters; the median installation cost for the 40-gal gas-fired water heater is based on 56 responses.

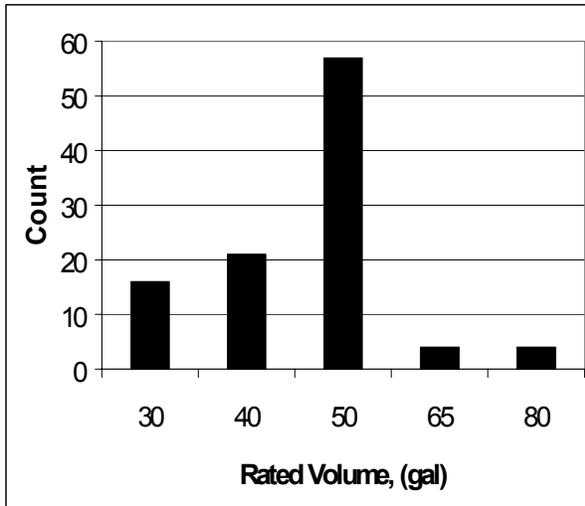


Figure 5.7 Unit Count of Electric Water Heaters with Installation Costs

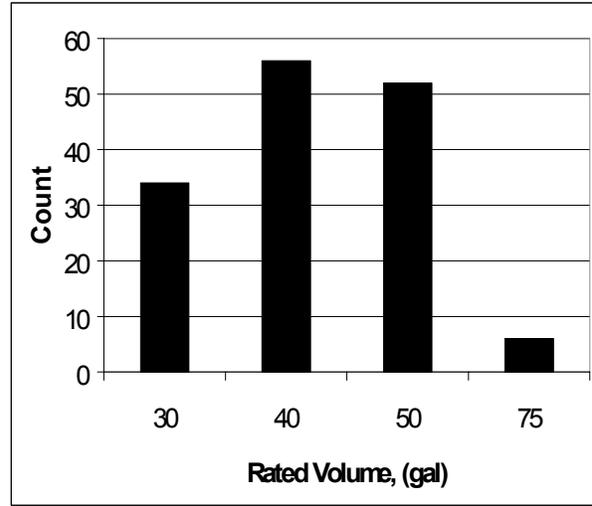


Figure 5.8 Unit Count of Gas-Fired Water Heaters with Installation Costs

The installation costs for all standard-size baseline water heaters are shown in Figure 5.9 for electric water heaters and in Figure 5.10 for gas-fired water heaters. The median values represent the average reported installation cost for each water heater size. The figures also show the minimum and maximum values for installation costs from the collected data. For example, the median installation cost for a 50-gal electric water heater is \$155.00, with the minimum reported to be as little as \$65.00 and the maximum as high as \$269.00. The relatively narrow installation cost range for 65-gal electric water heaters is primarily a result of the small number of responses for this particular tank size (see Figure 5.7). In the case of gas-fired water heaters, the median installation cost for a 40-gal size water heater is \$159.00, with a minimum of \$65.00 and a maximum of \$292.00.

The median installation cost for oil-fired water heaters is \$491.00, with a minimum of \$210.00 and a maximum of \$500.00. This is the cost for a new construction installation of a water heater without a burner. New construction installation costs for tank and burner vary from \$550 to a high of \$950.

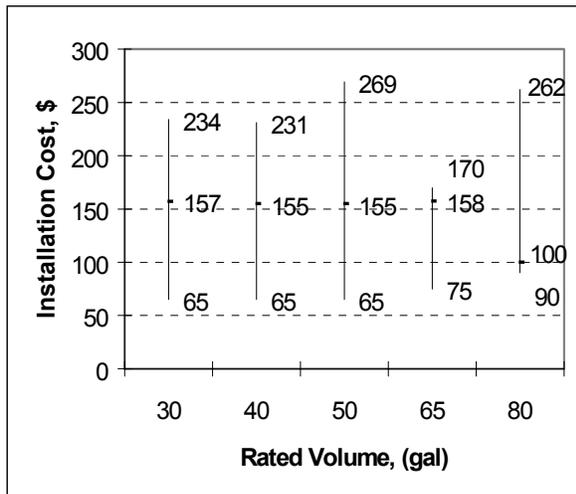


Figure 5.9 Installation Cost Ranges: Electric Water Heaters

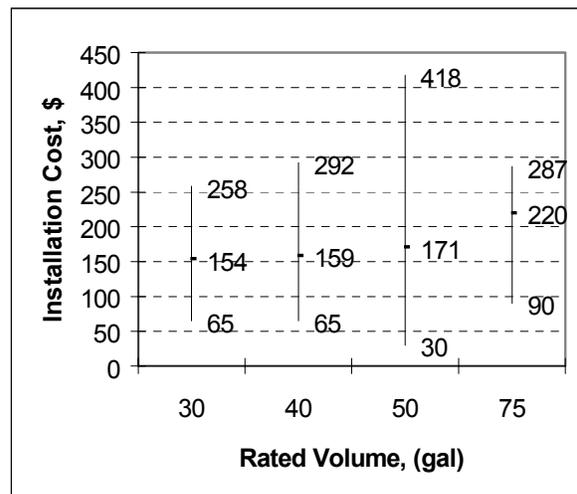


Figure 5.10 Installation Cost Ranges: Gas-Fired Water Heaters

5.3.3 Water Heater Shipments

As shown in Figures 5.3, 5.4, 5.7, and 5.8, there are significant differences in the number of responses for various standard water heater sizes. The fundamental reason is that some models (i.e., 40-gal and 50-gal models) are sold in significantly larger quantities than others. The number of units in the database correlate well with the shipments reported by Gas Appliance Manufacturers Association (GAMA). The total water heater shipments data are recorded annually by GAMA. The most current total shipments figures available are for 1998 and equal 8.8 million of which 4.1 million are electric water heaters and 4.7 million are gas-fired water heaters.

Figure 5.11 shows the 1998 electric water heater unit count from the Water Heater Price Database and the GAMA 1995 reported shipments and Figure 5.12 shows the same for gas-fired water heaters. Note that the data available for this comparison differ in terms of the year they refer to; it is assumed that shipments have increased proportionally.

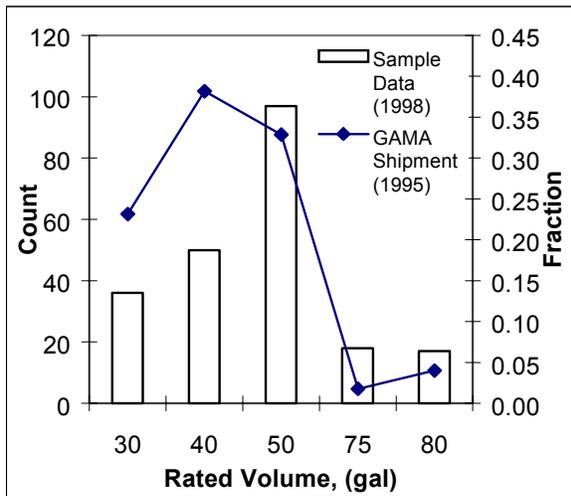


Figure 5.11 Electric Water Heaters: Shipments vs Sample Data

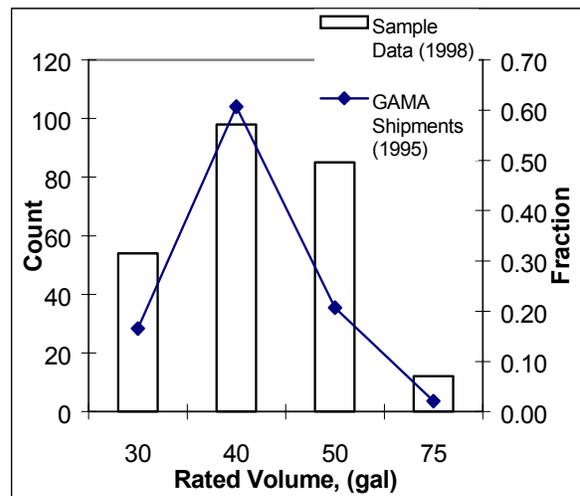


Figure 5.12 Gas-Fired Water Heaters: Shipments vs Sample Data

5.3.4 Other Summary Information

Descriptive tables and charts providing additional information about the Water Heater Price Database can be found in Appendix B.

REFERENCES

1. U.S. Department of Energy-Office of Codes and Standards, *Water Heater Price Database*, 1999. (Last accessed June 24, 2000).
<http://www.eren.doe.gov/buildings/codes_standards/applbrf/whdbver2.mdb>
2. Pacific Northwest National Laboratory, *Telephone calls to residential oil-fired equipment dealers*, April, 1998. Richland, WA.
3. Gas Appliance Manufacturers Association, *Statistical Release*, various years. Arlington, VA.
4. Population Reference Bureau, *2000 United States Population Data Sheet*, 2000. (Last accessed November 28, 2000). <<http://www.prb.org/pubs/usds2000/>>